



CONTINENTAL
MODEL 220

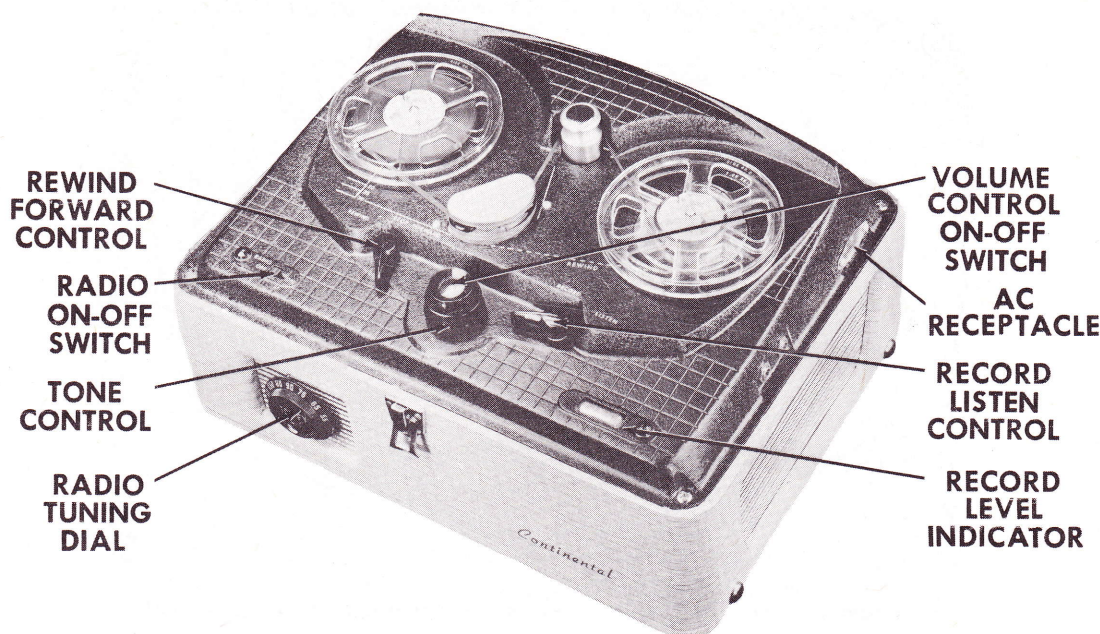


Figure 1

GENERAL INFORMATION

The Continental Model 220 is designed for twin-track two speed operation. The operating speeds are either 7 1/2 or 3 3/4 inches per second. The Continental is designed to record and play back two tracks of material on standard width recording tape, which doubles the playing time with no loss of frequency response or quality. Recordings can be made from a radio, television receiver or phonograph, in addition to those made directly from the microphone. Recordings can be played back through the self contained speaker, external speaker or through a high fidelity amplifier system.

This Continental is equipped with a dual speed capstan. When the capstan sleeve is in position over the capstan, the tape speed is 7.5 inches per second and with the sleeve removed, a tape speed of 3.75 inches per second will be obtained.

Using both channels of the tape, the recording time is as follows:

Size	Speed	Speed
	3 3/4"	7 1/2"
5"	1 hour	1/2 hour
7"	2 hours	1 hour

Connect this recorder only to an outlet supplying 117 volts, 60-cycle, AC supply.

Manufactured by:

Tape Recorders, Inc.
1501 West Congress Street
Chicago, Illinois

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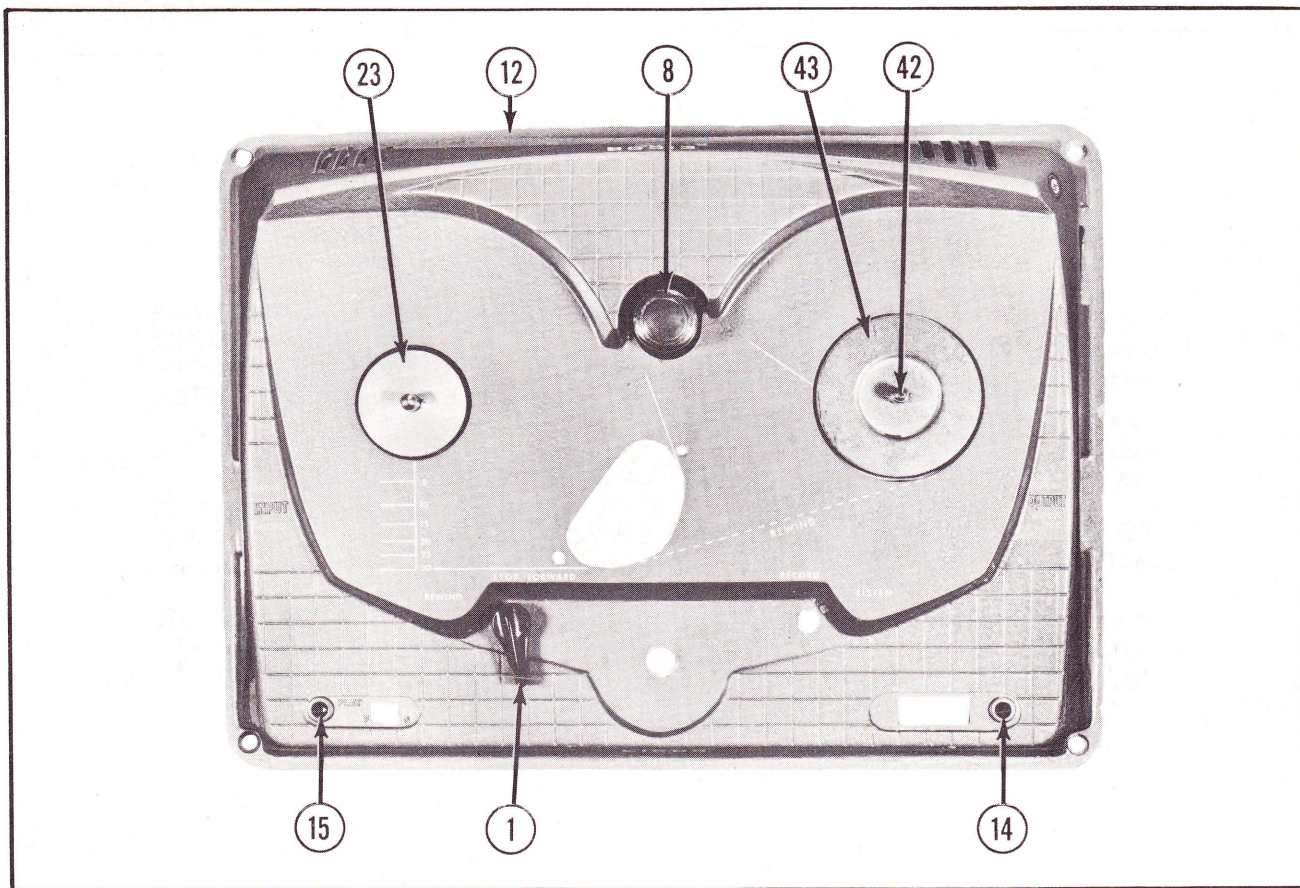


Figure 2

OPERATING CONTROLS

To Start-

Turn volume control knob (9) clockwise.

Volume-

Degree of rotation of volume control knob (9) determines volume of recording and playback.

Tape Travel-

Rewind-Stop-Forward control knob (1) controls direction of tape travel. Always return this knob to "Stop" position before turning unit off.

Record-Listen-

Record-Listen control knob (11) controls amplifier and record playback head. To prevent accidental erasure, place in "Listen" position immediately after recording is completed.

OPERATING INSTRUCTIONS

1. Insert the AC power cord into the receptacle on the rear of the case.

2. Plug the AC cord into a convenient wall receptacle of the proper rating.

Threading The Tape-

1. Place a reel of tape (either 5" or 7") on the left spindle (23) and an empty reel on the right spindle

(43) making sure the reel slots engage the reel pin on the spindle.

2. Thread the tape by following the solid printed line on the top panel (Figure 2).

NOTE: This recorder uses type "A" wound tape, i. e. the dull magnetic coated side faces inward on the reel. If the tape used is type "B" (coated side facing outward) the recording will be made at a very low sound level and the playback will be almost inaudible.

3. Insert the free end of the tape through to the hub of the right reel and place a pencil firmly over the tape, forcing it into one of the three radial slots. Turn the reel several turns (counterclockwise) with the pencil in this position until the tape is secured to the reel and all slack is taken up between reels.

To Record From Microphone-

1. Turn the volume control knob (9) to the right until a click is heard and allow about thirty seconds for the tubes to warm up.

2. Insert microphone plug into input socket labeled "Microphone".

3. Turn record-listen knob (11) to "Record" position. When in this position, all material already on the tape will be erased before a new recording is made.

4. While talking into the microphone, adjust the volume control until the neon indicator light flashes

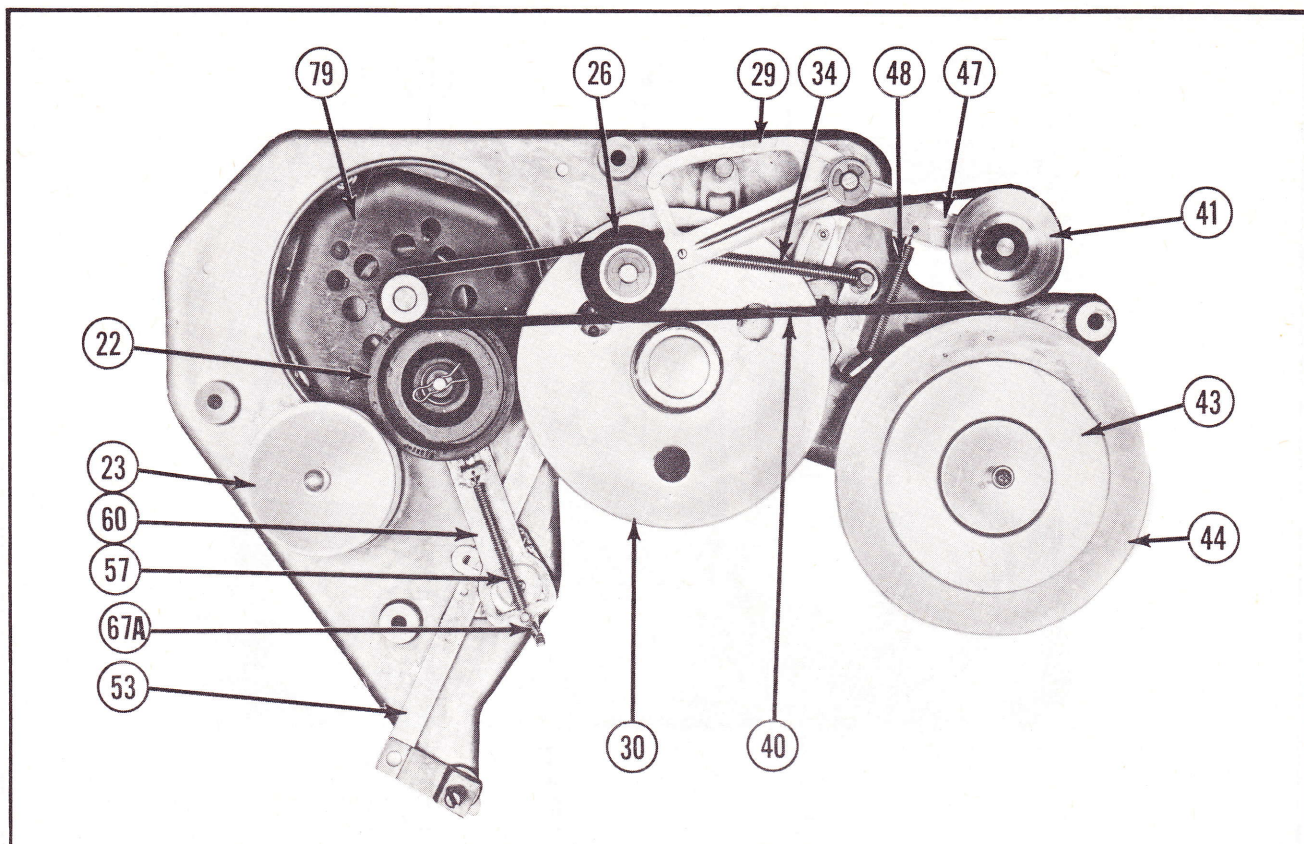


Figure 3

NOTE: Correct recording volume is very important. Too weak a signal, which does not cause the neon indicator to flash, will result in weak playback and high background noise. Too strong a signal, causing the indicator to flash constantly, will result in distortion during playback.

5. Turn the rewind-stop-forward control knob (1) to "Forward" position. The tape is now moving and any sound entering the microphone will be recorded on the tape.

To Record From Built-In Radio-

The built-in radio can be used in the following manner:

1. Turn the "On-Off" switch to the "On" position.
2. The "record-listen" switch should be in the "listen" position. (The green light will be on).
3. Then simply tune in any station you want using the tuning dial on the front of cabinet.
4. If the program comes on which you wish to record, simply move the record listen switch to the "record" position (the red light will go on) and move the "forward-rewind" switch to "forward" and you will be recording the program.

5. Make sure the volume control is adjusted to the point where the neon indicator just flickers on the louder notes.

To Change Speed-

The conversion to 3 3/4 inches per second from 7 1/2 inches per second speed is accomplished in the following manner.

1. Remove the larger diameter capstan (8) by lifting straight up and off.
2. By removing the larger capstan you leave the steel shaft of the capstan drum assembly (30) which is used for the speed of 3 3/4 inches per second.
3. To change back to 7 1/2 inches per second reverse the above procedure.

NOTE: Be sure when replacing larger capstan, that the pin inside properly engages the slot in the smaller capstan. If not in place properly variable speeds will result.

To Record From Phonograph-

1. Connect the cord clips of the attachment cord to the pickup leads on the phonograph.
2. Insert the attachment cord plug into the input socket labeled "Radio".
3. Proceed as described in "To Record From Microphone".

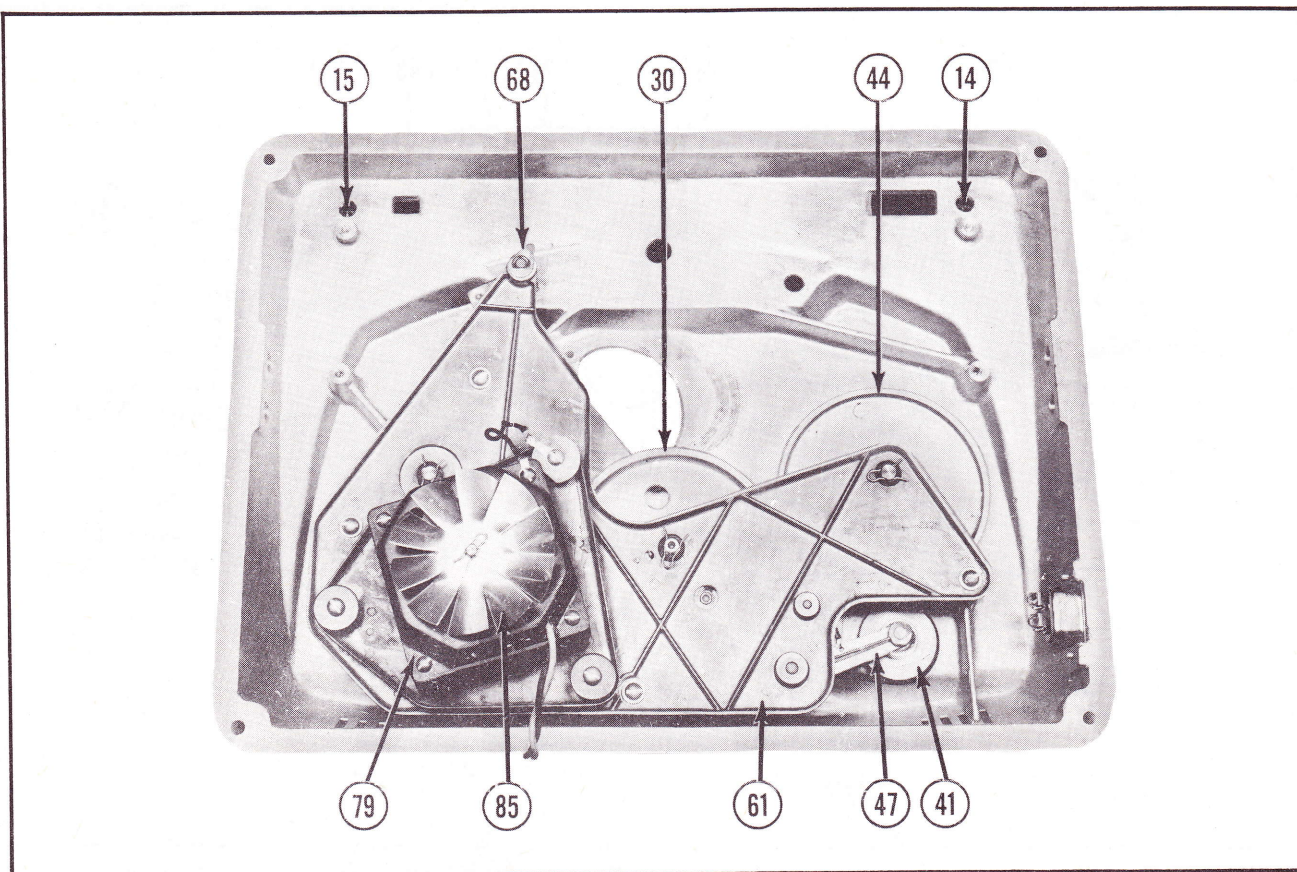


Figure 4

NOTE: Should a hum develop from the above connection, reverse the cord clips on the pickup leads.

To Record From Television Receiver-

1. Connect attachment cord as described in "To Record From Radio" and proceed with recording as described in "To Record From Microphone".

Dual Track Recording-

This recorder is designed so that 1/2 the tape width is recorded at a time; thereby resulting in two track recordings. This two track operation is accomplished in the following manner:

1. After a reel of tape has been recorded; i. e., all the tape wound on the right reel, place the rewind-stop-forward control knob (1) in the "Stop" position. This stops all movement of the tape.

2. Remove the reels from the recorder, turning the full reel over and placing it on the left spindle.

3. Properly thread the tape and proceed with the recording.

4. After the second track has been recorded the first track of recording is ready to be played, without rewinding, by reversing the reels as described in Step No. 2 above.

To Rewind-

1. With the volume control knob (9) turned on, turn the record-listen control knob (11) to "Listen"

2. Turn the rewind-forward control knob (1) to "Rewind" position. As the tape is rewinding you will hear the recording played backwards at a high rate of speed. When this sound stops, you have come to the start of the recording. To rewind a full reel of tape remove the tape from between the pressure roller (26) and capstan so the tape will rewind directly across the recorder to the left-hand reel; it will just touch the bottom of the recording head. This method is faster when rewinding an entire reel and reduces recording head wear.

To Play A Recording-

1. Thread the tape as described under "Threading The Tape".

2. Turn the On-Off-Volume control knob (9) on and allow approximately thirty seconds for the tubes to warm up.

3. Place the record-listen control knob (11) in the "Listen" position.

4. Place the rewind-stop-forward control knob (1) in the "Forward" position and adjust the volume control for desired level.

To Use An External Speaker-

Any size speaker of the permanent magnet type, having a 3.2Ω voice coil, may be used by connecting the attachment cord across the voice coil terminals of the speaker and then inserting the plug into the output socket labeled "Radio Speaker".

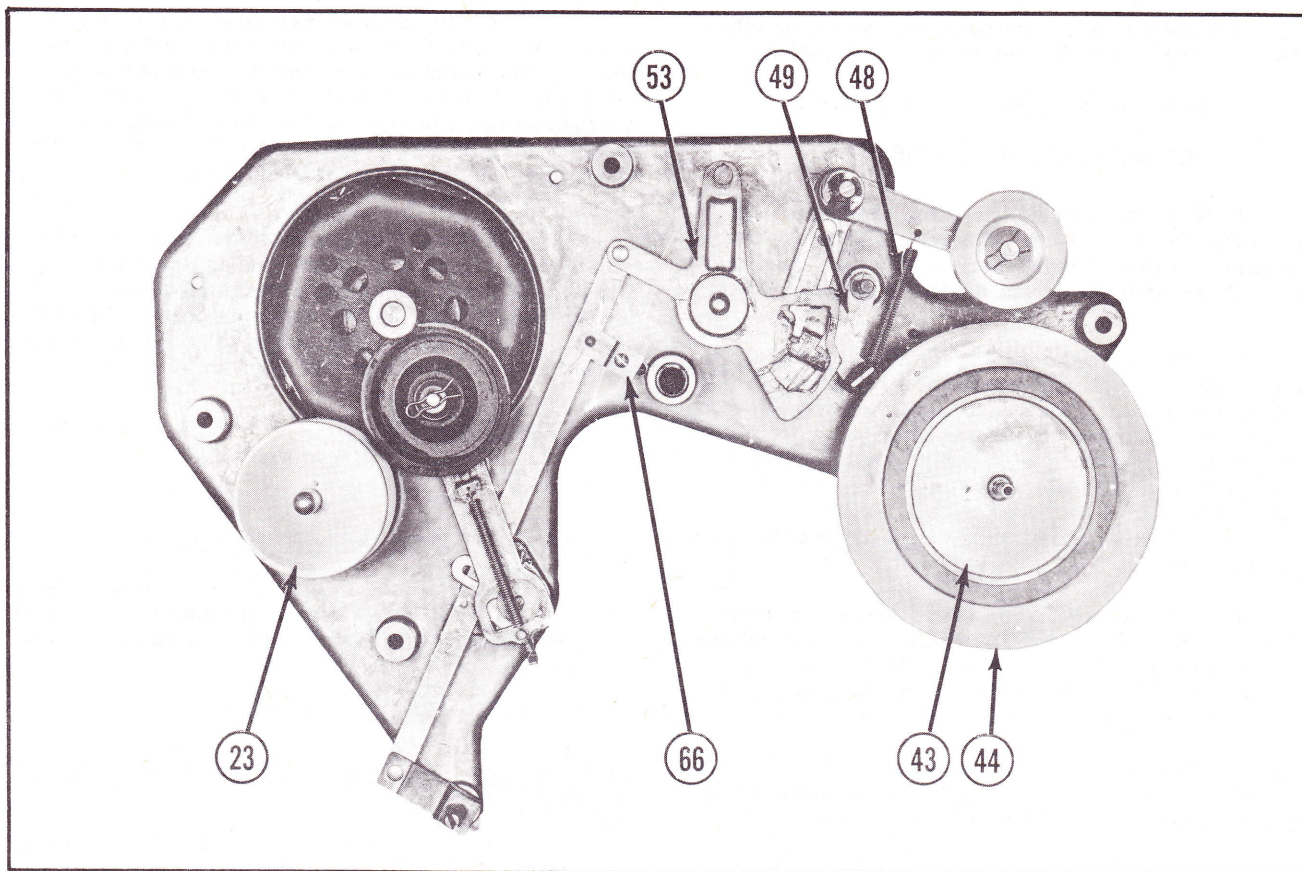


Figure 5

To Edit And Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selection into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

2. For best results, cut tape at a slight diagonal, join ends together with splicing tape on the glossy side and trim off any excess width.

Erasing Recorded Material-

It is not necessary to first erase a recorded tape if the same tape is to be used for a new recording. Erasing of recorded material takes place automatically when new material is recorded. If it is desired only to erase a tape, set the machine for recording without having the microphone or attachment cord connected to input jack.

DISASSEMBLY INSTRUCTIONS

To remove the recorder from its cabinet, remove the four phillips head screws (13) from the corners of the top panel (12). Insert a thin-blade screwdriver between the panel and the cabinet and pry upwards enough to slip the finger under the panel. Lift up enough to permit the speaker plug and AC leads, etc., to be disconnected. The recorder can now be removed complete.

In handling the recorder out of its cabinet, care must be taken to avoid damage to the motor fan (85) and the motor shaft. When replacing the recorder, check to be sure the speaker leads and AC leads will not be pinched or will not interfere with the recorder mechanism.

INSPECTION OF COMPLETE RECORDER

1. Visually inspect the alignment of the cam on the "Forward-Stop-Rewind" shaft. The cam should close the erase interlock switch when in the "Forward" position.

2. Move the tape through the machine, first in the forward direction and then in the rewind direction. The tape should pass midway between the flanges of the reel which is receiving the tape. Change shims under the recording head, if necessary, to achieve this.

3. With the recorder out of the cabinet and the motor running, orient the power transformer of minimum audible hum from the speaker. Tighten the four transformer mounting screws.

4. When placing the recorder in the cabinet, check for bent fan and for paths of speaker leads, motor leads and AC leads which will not interfere with any moving part of the mechanism.

5. Using plastic base tape, make microphone voice recordings at various volume control settings, including a recording of loud talking close to the mike with the volume control at maximum gain. Upon playback, the best recording should be that made with the neon bulb flashing only on the louder syllables. Erase the portion of tape having overloaded recording. No trace of the recording should remain.

6. Make a music recording from a disc or other source. Play back and listen for over-all quality.

7. Check for easy operations of controls.

MECHANICAL DRIVE ASSEMBLY

1. With the rewind-stop-forward control knob (1) in the "Stop" position, idler wheel 22 should be in a neutral position; that is, there should be a clearance of $1/32$ " between the motor shaft and the idler wheel.

2. With control knob (1) in the "Rewind" position, idler wheel (22) is pivoted against the rewind drum (23) and the motor shaft. This accounts for the fast rewind speed. Make a check, by turning the rewind drum (23) counterclockwise, to see if these parts contact each other properly. The idler wheel should turn the motor shaft. If this does not occur, check for binding parts, oil on the friction surfaces, or looseness of springs (57 and 67A).

3. When control knob (1) is in the "Forward" position, idler (22) is pivoted against the flywheel and capstan (30) and the "O" ring belt (40), which is driven by the motor belt pulley (16), is pivoted against the rim of the take-up drum (44).

4. With the motor running and control knob (1) in "Stop" position there should be at least $1/32$ " clearance between belt (40) and take-up drum (44).

5. With the motor running and control knob (1) in "Stop" position observe belt (40). The same portion of the belt surface should run in the pulley grooves at all times, that, the belt should not rotate above the center of a cross section. If such rotation does occur, belt pulley (16) is not correctly located.

6. Check end play of rewind drum (23), flywheel (30) and take-up drum (44). Each should have some end play, not more than $1/32$ ". Correct assembly of washers on these shaft should control this.

7. With control knob (1) in "Rewind" position, there should be at least $1/32$ " clearance between the rubber on the brake (49) and the take-up drum (44). With motor running, move the control knob slowly from "Rewind" to "Stop". Meanwhile, rotate the take-up drum (44) manually. The brake should rotate the take-up drum before the rewind drum stops rotating. Bend the brake arm to meet these requirements.

8. Place a full 5" reel of tape on the take-up spindle (43) and run the machine in the "Forward" position. Measure the tension required to hold the tape reel stationary. This tension should be 1 to 2 ounces.

NOTE: This tension should be measured after the machine has been running with the clutch slipping for at least one minute. The tension is controlled by the type and amount of lubricant used on the felt washer.

9. Using a 7 inch reel of tape and an empty 7 inch reel, thread the tape as for playing and observe the passage of the tape between the reel flanges on forward drive and on rewind. The tape should be centered between the reel flanges, and the clearance between reel flanges and top plate should be ample without having interference around the entire reel perimeter, it will be necessary to replace defective parts.

10. When threaded as for playing, and when powered by 115 volts 60 cycles, the unit should start re-winding when switched from "Off" to "Rewind" with an almost full 7 inch reel on the rewind drum and only a dozen or so turns of tape on the take-up reel. Failure to start may be due to weak motor or friction in the bearings of the capstan or take-up drum.

11. Check functioning of pressure roller by holding clutch plate on take-up drum and letting tape run through capstan. If tape does not run through smoothly, check to see if pressure roller surface is clean. The shaft should be well oiled. The pressure roller in contact should be flush up against the capstan.

TROUBLES

Take-Up Drum And Capstan Speed Irregular-

1. Grease or oil on the rubber drive surface of idler wheel (22), motor shaft, pressure roller (26) "O" belt (40) and take-up drum (44). Clean these parts with naphtha.

2. Motor belt pulley (16) loose.

Tape Overruns When Control Is Turned From "Rewind" To "Stop" Position-

1. Brake assembly (49) not adjusted properly. See "Mechanical Drive Assembly #7."

Tape Will Not Rewind-

1. Spring (57 and 67A) loose.

Failure To Erase-

1. Check head windings for open or shorted coils.

2. Check playing surfaces for dirt or other foreign material which would prevent close contact of the tape to the erase head surface.

3. Check position of head to be sure the tape is running over correct surfaces.

4. Check the head for excessive wear of the erase head surface.

5. Check the operation of the erase interlock switch.

Faulty Play-Back-

1. Same as above.

2. Check amplifier circuits, tubes, etc.

Wows-

1. Check capstan (30) for excessive runout.

2. Check idler (22) for worn or uneven surface.

3. Check for low line voltage.

4. Check for sticky tape or foreign material on the pick-up surface.

MODEL 220



5. Check the tape width and be sure that it is not binding in the guides.

6. Check for distorted reels or any other friction which might cause an excessive load on the motor or drive assembly.

7. Check pressure roller(26) for signs of foreign matter or excessive wear.

LUBRICATION

Extreme care should be taken when lubricating the mechanism. For satisfactory operation, the instructions in this section should be followed.

1. Mechanical linkages should be lubricated lightly at points of friction with Sta-Put No. 18-H.

2. The shafts of rotating parts, when replaced should be wiped clean with a lint-free cloth or paper and oiled lightly with Kensington No. 9 Spindle Oil. Use two or three drops.

3. When lubricating the felt washers on the take-up and rewind drum, use Sta-Put Oil No. 360 Saturate the felt washers and then remove as much of the oil as possible by pressing a cloth or absorbent paper against them.

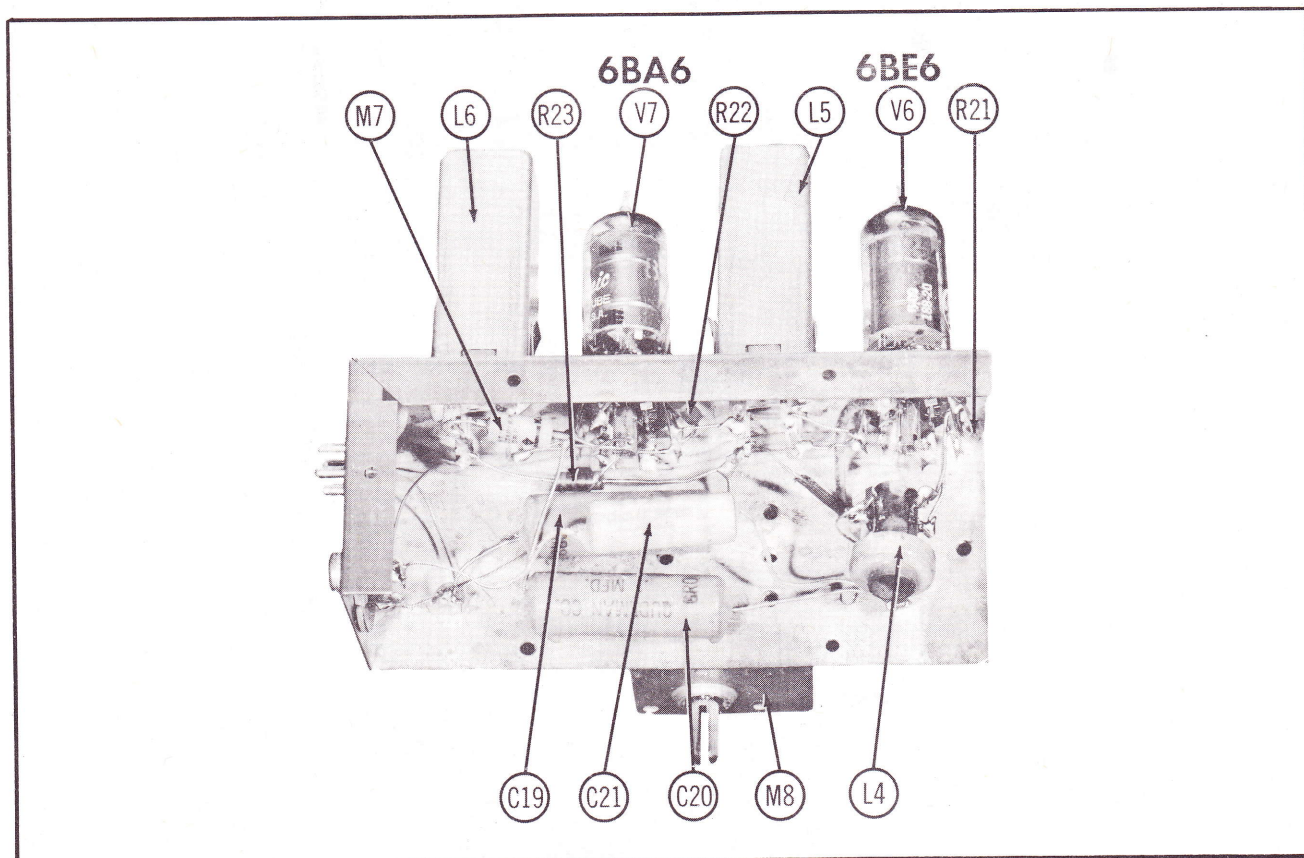
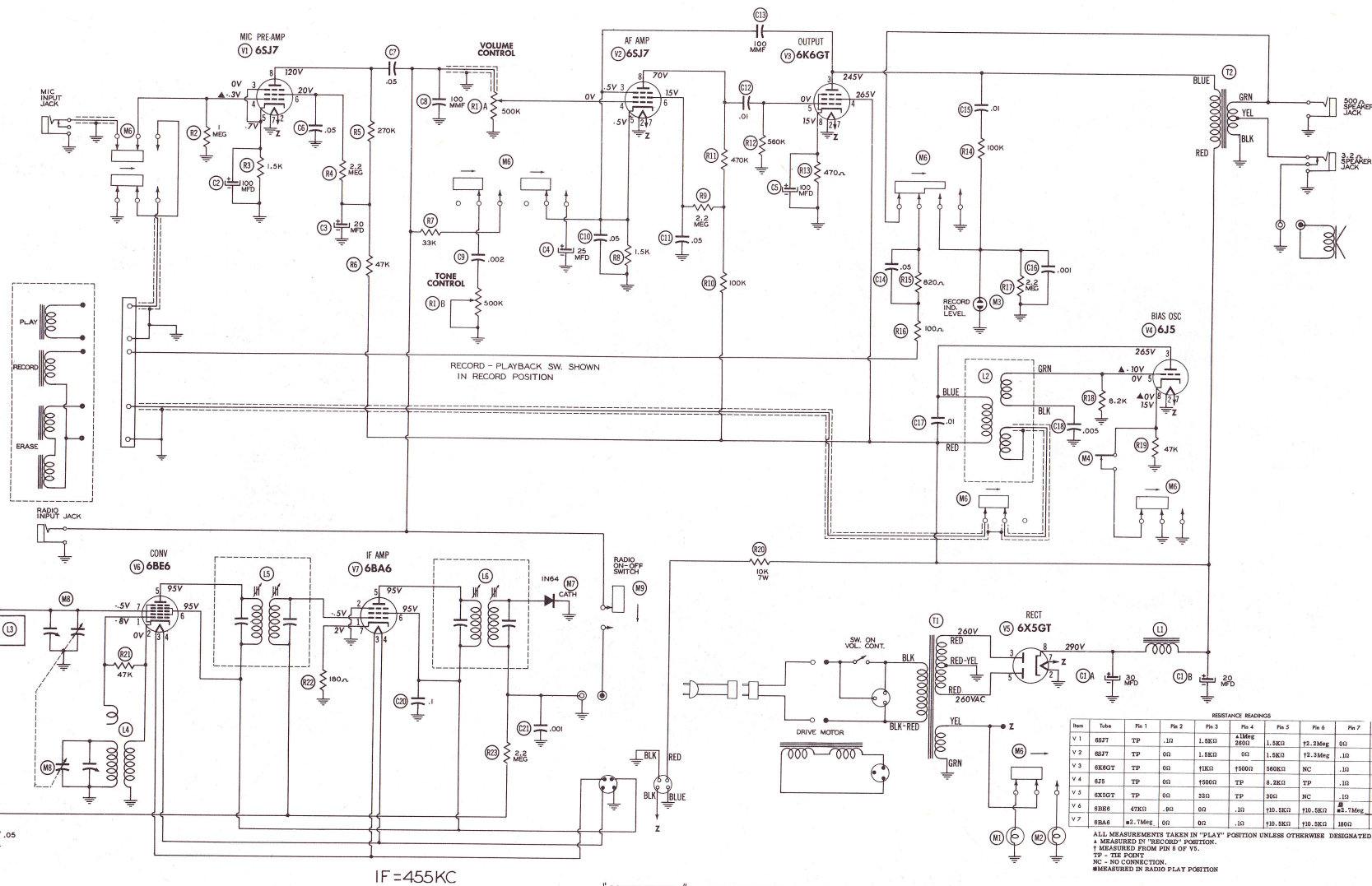


Figure 6

CONTINENTAL MODEL 220

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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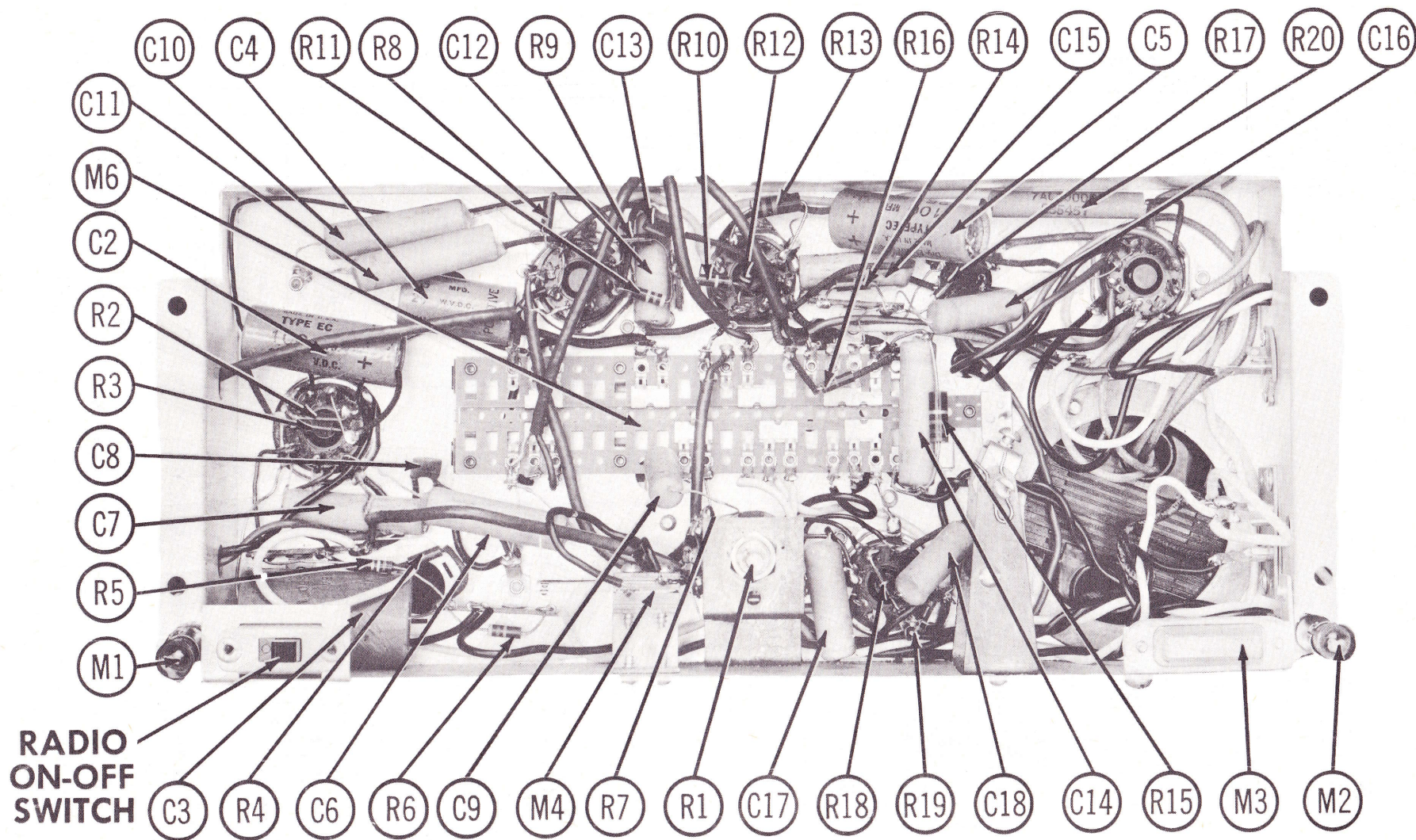


Figure 7

MECHANICAL PART LIST - Con't

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
60	TR-101-2089	Idler Lever & Pin Assembly	75	TR-101-2073	Spring Retainer
61	TR-301-2182	Base & Bushing Assembly	76	TR-301-4216	Washer, No. 10
62	TR-101-2070	Felt Washer	77	TR-301-4214	Round Head Machine Screw, 10-32 x 5/16
63	TR-301-2185	Bakelite Washer	78	TR-101-2086	Motor Mounting Plate (for Alliance motor)
64	TR-101-2073	Spring Retainer		TR-101-2134	Motor Mounting Plate (for Fasco motor)
65	TR-301-3184	Self Tapping Screw, No. 4	79	TR-101-1000	Motor (Alliance)
66	TR-301-2189	Control Link Stop		TR-101-2136	Motor (Fasco)
67	TR-101-2043	Idler Cam	80	TR-101-2001	Grommet
67A	TR-101-2039	Idler Cam Spring	81	TR-101-2006	Bushing
68	TR-301-2157	Control Switch Arm	82	TR-101-2150	Washer
69	TR-101-2073	Spring Retainer	83	TR-301-7002	Split Lockwasher, No. 10
70	TR-101-2070	Felt Washer	84	TR-101-7003	Round Head Machine Screw
71	TR-301-2185	Bakelite Washer	85	TR-101-2095	Fan
72	TR-101-2073	Spring Retainer	86	TR-101-2073	Spring Retainer
73	TR-101-2070	Felt Washer			
74	TR-301-2185	Bakelite Washer			

ELECTRICAL PARTS LIST

Ref. No.	Description	Ref. No.	Description
V1	6SJ7, Mic. Pre-Amp.	R4	Resistor, 2.2 Meg. 1/2 Watt
V2	6SJ7, AF Amp.	R5	Resistor, 270K, 1/2 Watt
V3	6K6GT, Power Output	R6	Resistor, 47K, 1/2 Watt
V4	6J5, Bias Oscillator	R7	Resistor, 33K, 1/2 Watt
V5	6X5GT, Rectifier	R8	Resistor, 1.5K, 1/2 Watt
C1A	Electrolytic Cap. 30MFD. @ 350V.	R9	Resistor, 2.2 Meg., 1/2 Watt
C1B	Electrolytic Cap. 20MFD. @ 350V.	R10	Resistor, 100K, 1/2 Watt
C2	Electrolytic Cap. 100MFD. @ 25V.	R11	Resistor, 470K, 1/2 Watt
C3	Electrolytic Cap. 20MFD. @ 350V.	R12	Resistor, 560K, 1/2 Watt
C4	Electrolytic Cap. 25MFD. @ 25V.	R13	Resistor, 470Ω, 1/2 Watt
C5	Electrolytic Cap. 100MFD. @ 25V.	R14	Resistor, 100K, 1/2 Watt
C6	Capacitor, .05MFD. @ 400V.	R15	Resistor, 820Ω, 1 Watt
C7	Capacitor, .05MFD. @ 400V.	R16	Resistor, 100Ω, 1/2 Watt
C8	Capacitor, Ceramic, 100MMF.	R17	Resistor, 2.2 Meg., 1/2 Watt
C9	Capacitor, .002MFD. @ 600V.	R18	Resistor, 8.2K, 1/2 Watt
C10	Capacitor, .05MFD. @ 400V.	R19	Resistor, 4.7K, 1/2 Watt
C11	Capacitor, .05MFD. @ 400V.	R20	Resistor, 10K, 7 Watt
C12	Capacitor, .01MFD. @ 600V.	T1	Power Transformer
C13	Capacitor, Ceramic, 100MMF.	T2	Output Transformer
C14	Capacitor, .05MFD. @ 400V.	L1	Filter Choke
C15	Capacitor, .01MFD. @ 600V.	L2	Bias Osc. Coil
C16	Capacitor, .001MFD. @ 600V.	SP1	5" x 7" Oval Speaker, PM (3.2Ω)
C17	Capacitor, .01MFD. @ 600V.	M1	Pilot Light, Type TS51 (Record Indicator)
C18	Capacitor, .005MFD. @ 600V.	M2	Pilot Light, Type TS51 (Play Indicator)
R1A	Volume Control & Switch, 500K (Rear Section)	M3	Neon Lamp (Record Level Indicator)
R1B	Tone Control, 500K	M4	Switch, Erase Interlock
R2	Resistor, 1 Meg., 1/2 Watt	M5	Speed Equalization Switch
R3	Resistor, 1.5K, 1/2 Watt	M6	Play Record Switch

RADIO ELECTRICAL PARTS LIST

Ref. No.	Description	Ref. No.	Description
V6	6BE6, Converter	R23	Resistor, 2.2 Meg., 1/2 Watt
V7	6BA6, IF Amplifier	L3	Loop Antenna
C19	Capacitor, .05MFD. @ 400V.	L4	Oscillator Coil
C20	Capacitor, .1MFD. @ 200V.	L5	Input IF
C21	Capacitor, .001MFD. @ 600V.	L6	Output IF
R21	Resistor, 47K, 1/2 Watt	M7	Crystal IN64
R22	Resistor, 180Ω, 1/2 Watt	M8	2 Gang Variable Capacitor